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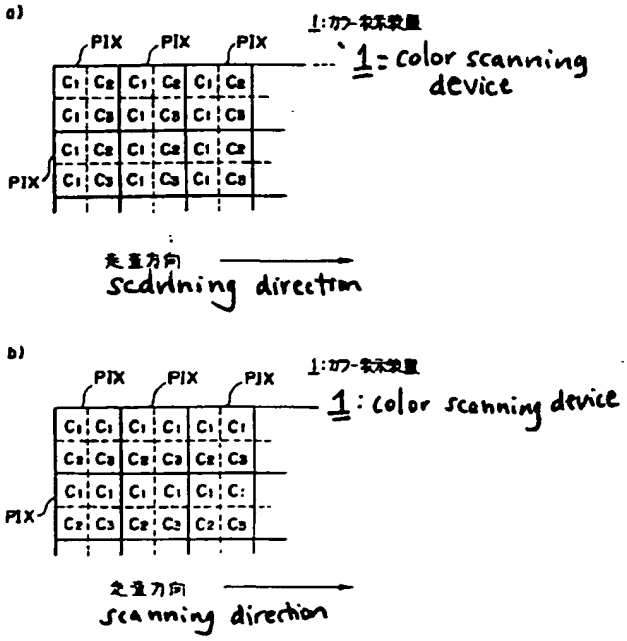
(54) [Title of the Invention]
Color Display Device

(57) [Abstract]
PURPOSE: To provide a color display device that facilitates memory control and whereby the number of control circuits is curtailed.
CONSTITUTION: In a color display device (1), two cells (C1) of any one of the three colors R, G, and B are used, and one each of the other cells (C2), (C3) are used for the two remaining colors, respectively; the four cells (C1), (C1), (C2) and (C3) are arranged approximately in a matrix to form a pixel PIX, and multiple pixels PIX are arranged approximately in matrix, wherein the two cells (C1), (C1) of the same color among the cells (C1, (C1), (C2) and (C3) constituting one pixel are arranged in a scanning direction or at right angles to the scanning direction.

Figure To Explain the Principle of the Present Invention
本発明の原理説明図



CLAIMS

[Claim(s)]

[Claim 1] Two cells (C1) of any 1 color are used among the cells of three colors of R, G, and B. the cell (C2 and C3) of other two colors -- respectively -- every one piece -- using -- four cells (C1 --) In the electrochromatic display (1) which has arranged C1, C2, and C3 in the shape of an abbreviation matrix, formed the pixel (PIX) and has arranged two or more pixels (PIX) in the shape of an abbreviation matrix The electrochromatic display characterized by having put in order and arranged two cells (C1) of the same color among the cells (C1, C1, C2, and C3) which constitute a pixel (PIX) in the direction which carries out an abbreviation rectangular cross with a scanning direction or a scanning direction.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the electrochromatic display with which a electrochromatic display is started, especially the display screens, such as a plasma display, CRT (Cathode Ray Tube), a liquid crystal display, a fluorescent display, an electroluminescence display, and a light emitting diode display, consist of pixels.
[0002] Now, although it is indispensable to perform color display in display, in case color display is performed, it is necessary to constitute 1 dot (display smallest unit) as 1 pixel.
[0003] By the way, when it constitutes this pixel from four cells combining each cell (it is hereafter called a red cell, a green cell, and a blue cell, respectively.) of R (Red), G (Green), and B (Blue), it becomes which cell of the four cells with a problem of which color a cell is arranged, and a electrochromatic display which has easy arrangement of control more is desired.
[0004]
[Description of the Prior Art] Cell arrangement of 4 conventional cell methods is shown in drawing 5 . When it constitutes 1 pixel from four cells combining a red cell, a green cell, and a blue cell, since two cells serve as the same color, as shown in drawing 5 , the cell of the same color is made to be arranged in the direction of slant. As for cell arrangement (i -iv) in case the number of green cells of cell arrangement (i -iv) in case the number of blue cells is two, and drawing 5 (b) is two, and drawing 5 (c), the red cell of drawing 5 (a) is cell arrangement in the case of being two pieces (i -iv).
[0005] The example of cell arrangement on the display screen at the time of using two blue cells for drawing 6 into 1 pixel is shown. In the case of drawing 6 , a red cell is arranged in an upper left cell, a blue cell is arranged in a lower left cell, a blue cell is arranged in an upper right cell, what has arranged the green cell in the lower right cell, and was made into 1 pixel (cell arrangement in drawing 5 (a) (i)) is arranged in the shape of a matrix, and the display screen is constituted.
[0006] The composition of the principal part of the conventional electrochromatic display is shown in drawing 7 . blue data DB into which the electrochromatic display 20 was inputted from the outside Memory MB for blue data storages to memorize green data DG inputted from the outside Memory MG for green data storages to memorize red data DR inputted from the outside Memory MR for red data storages to memorize Each memory MB for data storages, MG, and MR The memory address circuit 21 which outputs data-storage address signal ADW / data read-out address signal ADR, Column (column) selection signal Sc The column side control circuit 22 to output, Colour-selection signal Sr which chooses the color arrangement by the side of a low (row) The low side selection circuitry 23 to output, Column selection signal Sc And colour-selection signal Sr The memory selection circuitry 24 which chooses the memory for color data storages which should be based and should output data, Each memory MB for data storages, MG, and MR It has the parallel/serial-conversion circuit 25 which carries out serial/parallel conversion of the color data by which a shell output is carried out, and is outputted as a cell data (indicative data) CD, and is constituted.
[0007] Next, operation of a electrochromatic display 20 is explained with reference to drawing 6 . in this

case -- already -- each memory MB for data storages, MG, and MR **** -- corresponding color data shall be memorized

[0008] First, operation in the case of outputting the data of a column 1 is explained. The column side control circuit 22 is the column selection signal Sc corresponding to the column number 1. It is the colour-selection signal Sr corresponding to [output to the memory selection circuitry 24 and the low side selection circuitry 23, and / by this] the low number 1 in the low side selection circuitry 23. It outputs to the memory selection circuitry 24.

[0009] consequently, memory MR for red data storages the red data DR (refer to drawing 6 (b)) corresponding to "the column number 1 and the low number 1" in the memory selection circuitry 24 are remembered to be choosing -- memory MR for red data storages data read-out address signal ADR of the memory address circuit 22 -- being based -- red data DR It outputs to the parallel/serial-conversion circuit 25.

[0010] Next, the low side selection circuitry 23 is the colour-selection signal Sr corresponding to the low number 2. It outputs to the memory selection circuitry 24. consequently, memory MB for blue data storages the blue data DB (refer to drawing 6 (b)) corresponding to "the column number 1 and the low number 2" in the memory selection circuitry 24 are remembered to be choosing -- memory MB for blue data storages data read-out address signal ADR of the memory address circuit 21 -- being based -- blue data DB It outputs to the parallel/serial-conversion circuit 25.

[0011] Hereafter, all the color data (red and blue) about the column number 1 are similarly outputted to the parallel/serial-conversion circuit 25, and the parallel/serial-conversion circuit 25 is outputted to the driver which does not illustrate the color data of the column number 1 as a cell data CD of serial data.

[0012] Then, the column side control circuit 22 is the column selection signal Sc corresponding to the column number 2. Outputting to the memory selection circuitry 24 and the low side selection circuitry 23, thereby, the low side selection circuitry 23 is the colour-selection signal Sr of the low number 1. It outputs to the memory selection circuitry 24.

[0013] consequently, memory MB for blue data storages the blue data DB (refer to drawing 6 (c)) corresponding to "the column number 2 and the low number 1" in the memory selection circuitry 24 are remembered to be choosing -- memory MB for blue data storages data read-out address signal ADR of the memory address circuit 21 -- being based -- blue data DB It outputs to the parallel/serial-conversion circuit 25.

[0014] Next, the low side selection circuitry 23 is the colour-selection signal Sr corresponding to the low number 2. It outputs to the memory selection circuitry 24. consequently, memory MG for green data storages the green data DG corresponding to "the column number 2 and the low number 2" in the memory selection circuitry 24 (refer to drawing 6 (c)) are remembered to be choosing -- memory MG for green data storages data read-out address signal ADR of the memory address circuit 21 -- being based -- green data DG It outputs to the parallel/serial-conversion circuit 25.

[0015] All the color data (blue and green) about the column number 2 are outputted to the parallel/serial-conversion circuit 25 similarly hereafter. Thereby, the parallel/serial-conversion circuit 25 outputs the color data of the column number 2 to the driver which is not illustrated as a cell data CD of serial data.

[0016] Thus, the electrochromatic display 20 outputted the cell data CD one by one based on the color data from the outside, and showed the color picture.

[0017]

[Problem(s) to be Solved by the Invention] The arrangement differed for every column, even if it was the cell which has the same color in the above and the conventional electrochromatic display, the power color data read to a parallel/serial-conversion circuit based on both column number and low number had to be determined, it became complicated memory controlling [which controls the read-out sequence of the memory for color data storages of having memorized color data], and there was a flume trouble that the number of control circuits also increased.

[0018] Then, memory control is easy for the purpose of this invention, and is to offer the electrochromatic display which can cut down the number of control circuits.

[0019]

[Means for Solving the Problem] Principle explanatory drawing of this invention is shown in drawing 1 . In order to solve the above-mentioned technical problem, this invention is the cell C1 of any 1 color among the cells of three colors of R, G, and B. Two pieces are used. The cell C2 of other two colors, and C3 It uses one piece at a time, respectively. Four cells C1, C1, C2, and C3 In the electrochromatic display 1 which has arranged in the shape of an abbreviation matrix, formed Pixel PIX and has arranged two or more pixels PIX in the shape of an abbreviation matrix The cell C1 which constitutes Pixel PIX, C1, C2, and C3 They are two cells C1 of the same color inside. It arranges, arranges and constitutes in the direction which carries out an abbreviation rectangular cross with a scanning direction or a scanning direction. Here, drawing 1 (a) is two cells C1 of the same color. The case where the scanning direction has been put in order and arranged in the direction which carries out an abbreviation rectangular cross is shown, and drawing 1 (b) is two cells C1 of the same color. The case where it has arranged and arranged to the scanning direction is shown.

[0020]

[Function] Since two cells of the same color are put in order and arranged among the cells which constitute a pixel in the direction which carries out an abbreviation rectangular cross with a scanning direction or a scanning direction according to this invention, the cell of the same color is always in the same position (for example, low position) to a scanning direction irrespective of a scanning position (for example, column position) and it is not necessary to change a display control according to a scanning position, control becomes easy and a control circuit can be simplified.

[0021]

[Example] Next, the suitable example of this invention is explained with reference to a drawing. Cell arrangement of 4 cell methods of this example is shown in drawing 2 .

[0022] In this example, when it constitutes 1 pixel from four cells combining a red cell, a green cell, and a blue cell, since two cells serve as the same color, as shown in drawing 2 , the cell of the same color is made to be arranged lengthwise (the direction of a column). As for cell arrangement (i -iv) in case the number of green cells of cell arrangement (i -iv) in case the number of blue cells is two, and drawing 2 (b) is two, and drawing 2 (c), the red cell of drawing 2 (a) is cell arrangement in the case of being two pieces (i -iv).

[0023] The example of cell arrangement on the display screen at the time of using two blue cells for drawing 3 is shown. In the case of drawing 3 (a), a blue cell is arranged in an upper left cell, a blue cell is arranged in a lower left cell, a red cell is arranged in an upper right cell, what has arranged the green cell in the lower right cell, and was made into 1 pixel (cell arrangement in drawing 2 (a) (i)) is arranged in the shape of a matrix, and the display screen DSP is constituted. In this case, the well of simplification of illustration, column number =4, a low number = the case of 14 is shown.

[0024] The composition of the principal part of a electrochromatic display is shown in drawing 4 . blue data DB into which the electrochromatic display 10 was inputted from the outside Memory MB for blue data storages to memorize green data DG inputted from the outside Memory MG for green data storages to memorize red data DR inputted from the outside Memory MR for red data storages to memorize Each memory MB for data storages, MG, and MR The memory address circuit 11 which outputs data-storage address ADW / data read-out address signal ADR, The column side control circuit 12 which outputs the column selection signal Sc and Sc', Column selection signal Sc Memory selection signal SM for choosing the memory for data storages which should be based and should output data The memory selection circuitry 13 to output, Each memory MB for data storages, MG, and MR It has the parallel/serial-conversion circuit 14 which carries out serial/parallel conversion of the color data by which a shell output is carried out, and is outputted as a cell data (indicative data), and is constituted.

[0025] Next, operation of a electrochromatic display 10 is explained with reference to drawing 3 . in this case -- already -- each memory MB for data storages, MG, and MR **** -- corresponding color data being memorized and the memory selection circuitry 13 in the column which has an odd number the turn of "blue, red, blue, and red [--]" -- color data -- the memory MB for data storages, MG, and MR from -- it operating so that it may read, and in the column which has an even number the turn of "blue, green, blue, and green [--]" -- color data -- the memory MB for data storages, MG, and MR from -- it

shall operate so that it may read
[0026] First, operation in the case of outputting the data of a column 1 is explained. The column side control circuit 12 is the column selection signal Sc corresponding to the column number 1. It outputs to the memory selection circuitry 13.
[0027] consequently, memory MB for blue data storages which has memorized the power blue data DB (refer to drawing 3 (b)) which the memory selection circuitry 13 corresponds to "the column number 1", and are read to the 1st (= low number 1) choosing -- memory MB for blue data storages data read-out address signal ADR of the memory address circuit 11 -- being based -- blue data DG It outputs to the parallel/serial-conversion circuit 14.
[0028] next, memory MR for red data storages the red data DR (refer to drawing 3 (b)) which are color data of the power which reads the memory selection circuitry 13 to the degree (= low number 2) corresponding to "the column number 1" are remembered to be choosing -- memory MR for red data storages data read-out address signal ADR of the memory address circuit 11 -- being based -- red data DR It outputs to the parallel/serial-conversion circuit 14.
[0029] Hereafter, all the color data (blue and red) about the column number 1 are outputted to the parallel/serial-conversion circuit 14 by updating a low number similarly. Thereby, the parallel/serial-conversion circuit 14 outputs the color data of the column number 1 to the driver which is not illustrated as a cell data of serial data.
[0030] Then, a column side control circuit is the column selection signal Sc corresponding to the column number 2. It outputs to the memory selection circuitry 13. consequently, memory MB for blue data storages which has memorized the power blue data DB (refer to drawing 3 (c)) which the memory selection circuitry 13 corresponds to "the column number 2", and are read to the 1st (= low number 1) choosing -- memory MB for blue data storages data read-out address signal ADR of the memory address circuit 11 -- being based -- blue data DG It outputs to the parallel/serial-conversion circuit 14.
[0031] next, memory MR for red data storages the red data DR (refer to drawing 3 (b)) which are color data of the power which reads the memory selection circuitry 13 to the degree (= low number 2) corresponding to "the column number 1" are remembered to be choosing -- memory MR for red data storages data read-out address signal ADR of the memory address circuit 11 -- being based -- red data DR It outputs to the parallel/serial-conversion circuit 14.
[0032] Hereafter, similarly, by updating a low number, the memory selection circuitry 13 outputs all the color data (blue and red) about the column number 2 to the parallel/serial-conversion circuit 14, and outputs the parallel/serial-conversion circuit 14 to the driver which does not illustrate the color data of the column number 2 as a cell data of serial data.
[0033] Thus, a electrochromatic display 10 outputs a cell data one by one based on the color data from the outside, and displays a color picture. Since, as for the cell of the same color, the low number is arranged at either the odd number or the even number according to this example as mentioned above, if a column number is specified, the turn of the color data to read will also be determined. Therefore, since what is necessary is in the case of an above-mentioned example to always read blue data when the number of low numbers is odd, and just to read red or green data according to a column number when the number of low numbers is even, memory control becomes easy, and since it is not necessary to prepare a low side selection circuitry etc., it becomes possible to cut down the number of circuits.
[0034] It is the column selection signal Sc of the column side control circuit 12 about the memory for color data storages which should output color data to the parallel/serial-conversion circuit 14 in the above example. By choosing Although the parallel/serial-conversion circuit 14 was outputting the color data outputted as a cell data as it was It is based on column selection-signal Sc' (= column selection signal Sc). the parallel/serial-conversion circuit 14 The memory MB for color data storages, MG and MR It is also possible to constitute so that the color data outputted to shell **** (parallel) may be incorporated one by one, may be rearranged and it may output as a cell data.
[0035] Moreover, in the above example, although the case where the cell of the same color was arranged to lengthwise (the direction of a column) was explained, it is also possible to constitute so that the same color may be arranged in a longitudinal direction (the direction of a low). For example, if the same color

is altogether arranged when the number of column numbers is odd, and other two colors are arranged by turns when the number of column numbers is even, it will become possible to choose similarly the memory for power data storages which reads color data only by the column number.

[0036]

[Effect of the Invention] According to this invention, two cells of the same color are put in order and arranged among the cells which constitute a pixel in the direction which carries out an abbreviation rectangular cross with a scanning direction or a scanning direction. A scanning position Since the cell of the same color is always in the same position (for example, low position) to a scanning direction irrespective of (for example, a column position), If its attention is paid to the cell of a color set in any column, namely, since the arrangement position of the cell concerned is fixed, Since it is not necessary to change display controls which have memorized color data according to a scanning position, such as color data read-out turn control from the memory for color data storages, control becomes easy and a control circuit can be simplified.

[Translation done.]

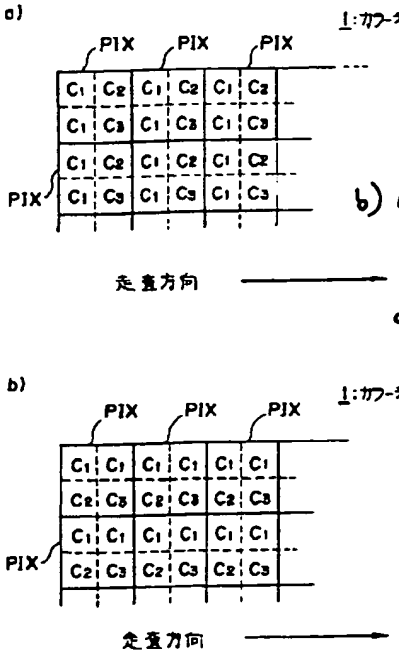
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is principle explanatory drawing of this invention.
[Drawing 2] It is explanatory drawing of cell arrangement of an example.
[Drawing 3] It is explanatory drawing of the pixel arrangement on the display screen of an example.
[Drawing 4] It is the block diagram showing the composition of the principal part of the electrochromatic display of an example.
[Drawing 5] It is explanatory drawing of the conventional cell arrangement.
[Drawing 6] It is explanatory drawing of the pixel arrangement on the conventional display screen.
[Drawing 7] It is the block diagram showing the composition of the principal part of the conventional electrochromatic display.
[Description of Notations]
1 -- Electrochromatic display
C1, C1, C2, and C3 -- Cell
PIX -- Pixel
10 -- Electrochromatic display
11 -- Memory address circuit
12 -- Column side control circuit
13 -- Memory selection circuitry
14 -- Parallel/serial-conversion circuit
ADW -- Data-storage address signal
ADR -- Data read-out address signal
CD -- Cell data (indicative data)
DB -- Blue data
DG -- Green data
DR -- Red data
MB -- Memory for blue data storages
MG -- Memory for green data storages
MR -- Memory for red data storages
Sc and Sc' -- Column selection signal
SM -- Memory selection signal

[Translation done.]

~~[図1]~~ Figure 1

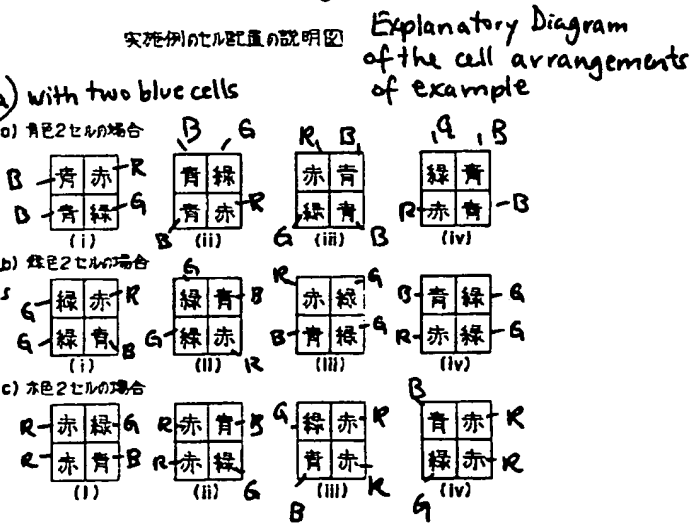
本発明の原理説明図



~~[図2]~~ Figure 2

実施例のセル配置の説明図

Explanatory Diagram of the cell arrangements of example



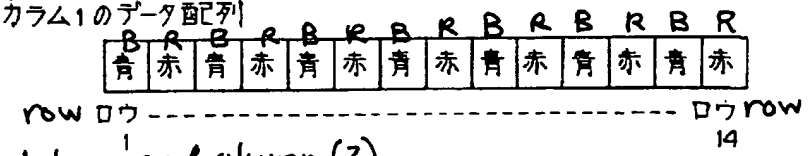
~~図3~~ Figure 3

実施例の表示画面上の画素配置の説明図 Explanatory diagram on pixels arrayed on the display screen of an embodiment.

a)

DSP:表示画面 - display screen.

b) data array of column (1) カラム1のデータ配列



c) data array of column (2) カラム2のデータ配列

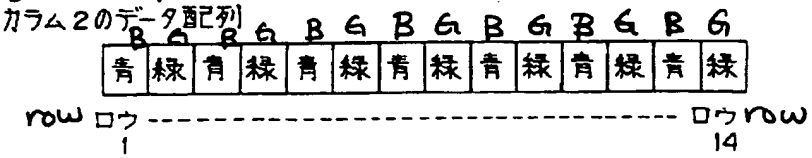
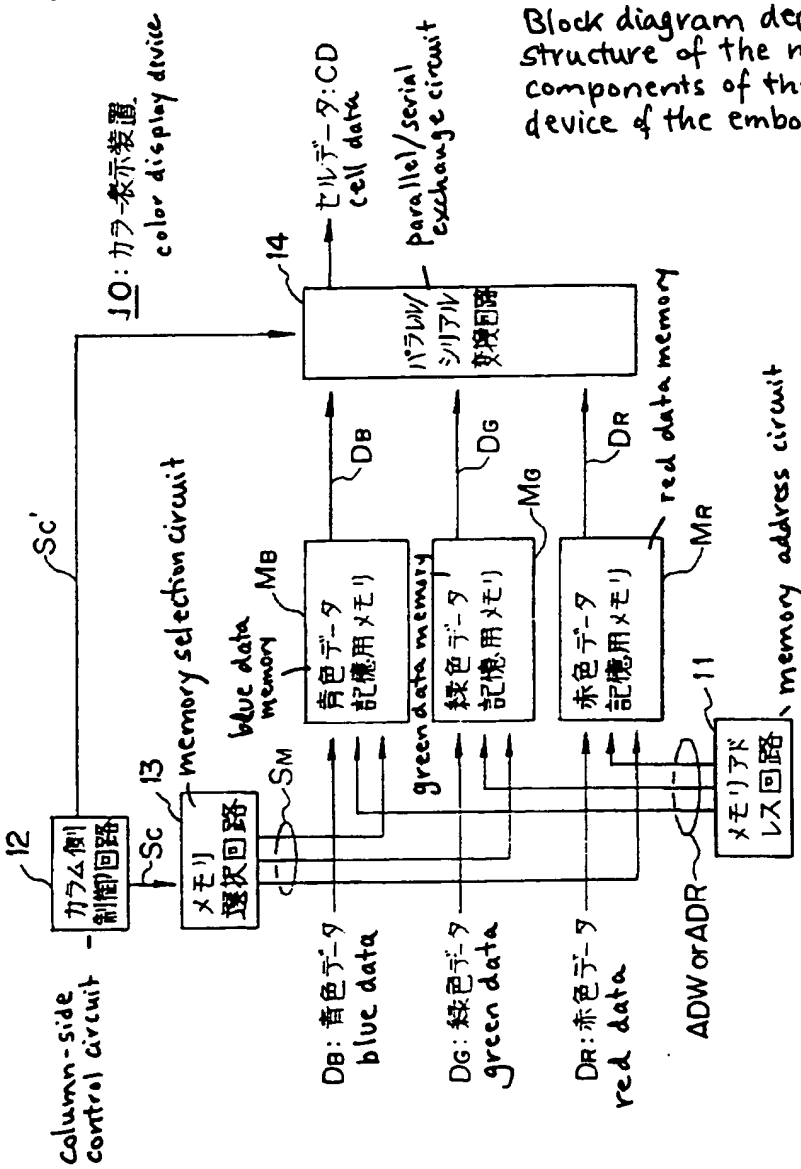


図4 Figure 4

実施例のカラー表示装置の主要部の構成を示すブロック図

Block diagram depicting the structure of the main components of the color display device of the embodiment.

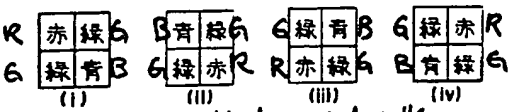


【図5】 Figure 5

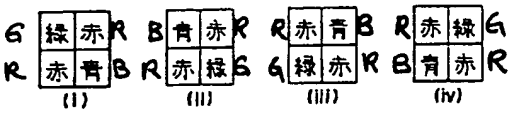
従来のセル配置の説明図 Explanatory Figure of a conventional cell device

a) 青色2セルの場合 → with two blue cells

b) 緑色2セルの場合 → with two green cells

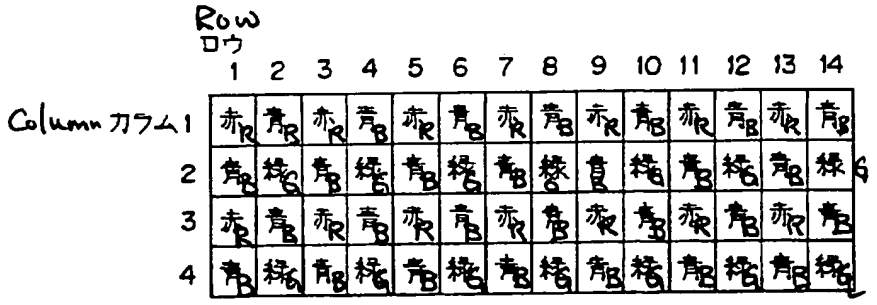


c) 赤色2セルの場合 → with two red cells.

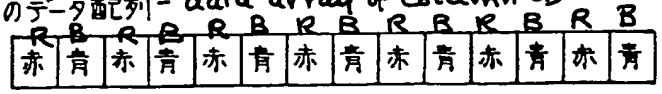


【図6】 Figure 6

従来の表示画面上の画素配置の説明図
Explanatory figure of a pixel array on a conventional screen.



カラム1のデータ配列 - data array of column (1)



row ロウ 1 ---------- ロウ 14 row

カラム2のデータ配列 - data array of column (2)

row ロウ 1 ---------- ロウ 14 row

Figure 7

従来のカラー表示装置の主要部の構成を示すブロック図

Block diagram depicting the structure of the main components of the color display device of the embodiment.